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a screw cut on the axis of the sprocket-wheel. One turn of the screw moves the prisms about three inches. The achromatic prisms are about two and one-quarter inches (6 cm.) on a side and their combined deviation is $4^{c}\ 23'\ 35''$, somewhat greater than that of the double image prism when they are brought near to it, but less when they are moved to their extreme position.

The simplicity of construction of this instrument insures the stability of its adjustments. Practically, it is only necessary to see that the line joining the centres of the two images is perpendicular to the edges of the achromatic prisms. If this is not the case, the adjustment is easily made by turning the tube holding the double image prism.

When the photometer is attached to the thirty-six-inch telescope and the achromatic prisms are brought as near as possible to the focus, stars about two and one-half minutes of arc apart may be compared. This is the minimum limit. The practical maximum limit is reached when the prisms are moved thirty-two inches from the focus, for at this point the diameter of the cone of rays from the object-glass equals the length of the side of the achromatic prism. In this position of the prisms, stars about twelve minutes of arc apart may be compared.

The loss of light by the process of polarization and by reflection and absorption of the various prisms used, reduces the brightness of the stars by about one and one-half magnitudes. It is, therefore, possible to measure with great accuracy the brightness of any star one and one-half magnitudes brighter than the limit of visibility of the telescope.

Mt. Hamilton, September 6, 1897.

CATALOGUE NO. II, OF NEBULÆ DISCOVERED AT THE LOWE OBSERVATORY, ECHO MOUNTAIN, CALIFORNIA.

By Lewis Swift.

The following list of twenty-five nebulæ follows No. I of fifty, discovered at this observatory and published in the *Astronomical Journal* of November 13, 1896, and also in the *Publications* of the Astronomical Society of the Pacific. Since my return to this observatory in April last, after an absence of several months, I have devoted my time to searching for comets, as well as for nebulæ, for which this anomalous climate is so well adapted. The following facts will illustrate its truth. The number of clear nights in May, 1897, were twenty-five, and rain-fall 0.87 of an inch. On June 28th, rain-fall 0.10; in July, precipitation 0.15. I have never seen a month, except the last, when every night was clear, but in June, 1896, every one was clear with a single exception, and that was foggy. One peculiarity about this climate is, that there are more cloudless nights than days, which is the reverse of conditions at the Warner Observatory at Rochester, New York.

No.	DATE OF DISCOVERY.	R. A.	DEC. FOR 1900.	DKSCRIPTION.
		h m s	° ′ ″	
1	Mar. 23,'95	8 5 38	+ 5 22 47	eeeF. vS. lE. v close f. 12^m * . D * nf. points nearly to it. eedif.
2	May 4,	11 47 23	— 3 10 12	vF. pS. R. B * f 55^s. np of 2.
3	Mar. 23,'95	11 48 33	— 3 25 15	eF. pS. R. 2 B st in field one n the other np.
4	Mar. 23,'95	11 48 48	— 4 34 15	eeeF. vS. eE. a ray. in vacancy. 4 F st in line s. 1 B & 3 F st n.
5	May 23,	11 49 23	— 2 10 0	vF. vS. R. vF * near nf.
6	May 23,	12 43 2	+ 54 59 45	eeF. S. CE. in field with N. G. C. 4732.
7	May 23,	13 4 27	+ 53 22 48	eF. pL. R.
8	May 22,	13 18 33	+ 6 45 16	eeeF. pS. CE. in vacancy. v dif.
9	June 25,	13 47 20	+ 14 46 55	eeeF. pL. R. eeedif. 3d of 4.
10	Apr. 30,	13 47 38	— 0 38 0	vL. pF. CE. n & s. in field with 5334. A F st close to each end of major axis. See note.
11	June 2,	14 46 16	+ 27 59 17	eeF. S. lE. pB * p. eeedif. another near suspected.
12	June 2,	14 49 37	+ 16 47 5	vF. pS. R. only 1 * near 10^m nf.
13	June 21,	15 14 59	+ 2 8 52	vF. vE. pS. B * in field n partly obscures it.
14	June 3,	15 19 52	+ 13 50 10	eF. pS. vF * close np.
15	June 21,	15 30 0	+ 5 2 0	eF. pS. R. near the 1st of 6 or 8 st in a curved line.
16	July 22,	16 18 45	+ 12 59 16	eeeF. S. lE. F * near f. 2 B st in field s nearly point to it. eeedif.
17	July 6,	19 22 0	— 36 24 05	B. eS. lE. stellar. looks like close D * both nebulous. Note.
18	July 6,	19 49 10	— 37 37 13	eeeF. pS. 3 st s like belt of *Orion* point to it. eeedif.
19	July 6,	19 53 17	— 38 53 33	eeeF. S. lE. precedes the below 37^s eedif. p of 2.
20	July 6,	19 53 55	— 38 53 33	eeF. pS. R. 8^m * f 20^s f of 2.
21	July 8,	19 59 0	— 48 42 25	eeeF. pS. R. F * near n. eedif. p. of 2.
22	July 22,	20 2 16	— 45 55 42	vF. pS. R.
23	June 9,	20 38 39	— 30 16 30	eF. pS. vE. eeF * and a vF * near sf. point to it. s p. of 2.
24	June 9,	20 38 45	— 30 6 30	eeF. pS. vE. 8^m * 31′n. v dif. nf of 2.
25	July 7,	22 35 0	— 38 33 48	vF. pS. R.

NOTES.

No. 10. This is a remarkable object. I have never seen one just like it. It resembles an elliptical planetary nebula. The light is evenly diffused, and the limb as sharp as a planet. Strange, Sir WILLIAM HERSCHEL missed it, being so near his III 665. Munich 9619 is nf 121^s.

No. 17. This also is a singular object. I have never seen but one resembling it, and that was on the same night, which I think is N. G. C. 6861. It resembles a close, bright, double star, each component having a small, bright, round, star-like, nebulous disc. A power of 200 failed to divide it.

The places are for 1900.0, and the year of discovery, except when otherwise noted, is for 1897.

N. G. C. 6550 must be struck out, as it is identical with H. III 555.

ECLIPSE OF THE SUN, JULY 29, 1897.

By DAVID E. HADDEN.

The partial eclipse of the Sun on July 29th ult. was observed in Alta, Iowa, under favorable conditions, the sky being cloudless. First contact occurred at $7^h\ 33^m\ 02^s$; the Sun's disc was a little unsteady, and this time is probably a few seconds late. Last contact was noted at $9^h\ 35^m\ 47^s$ and is quite accurate, the definition being fine.

The limb of the advancing Moon bisected the larger sun-spot nearest the west limb at $7^h\ 47^m\ 20^s$, and its reappearance was observed at $8^h\ 20^m\ 55^s$. An interesting phenomenon was the apparent blackening of the umbra of the sun-spot, as the edge of the Moon reached it (the umbra before appearing a shade lighter than the Moon). I also noticed a peculiar lengthening of the umbra toward the Moon's limb as it reached its edge — a "black drop" appearance on a very small scale. I hardly think this was owing to the inequalities of the Moon's edge, as the same appearance was repeated during the spot's reappearance.

The sunlight was quite decidedly changed about mid-eclipse, and the temperature of the air in the shade fell four degrees, as recorded by a registering minimum thermometer. Time used is